Parkinson's Disease Patient Monitoring System Using IoT

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Abstract- *Parkinson's disease (PD) is a common and disabling pathology that is characterized by both motor and non-motor symptoms and affects millions of people worldwide. works in literature discuss the effects of the disease.The most promising trends involve sensor devices, low cost, low powe r, obtrusive , and accurate in them easurements, for monitoring and managing the pathology.Parkinson's disease (PD) is a complicated disorder that affects the brain and causes problems with movement. The disease can start on one side of the body and is identified by symptoms like slow movements, muscle stiffness, and shaking when resting. Besides these symptoms, there are other problems like sleep problems, bladder troubles, and changes in mood that can also happen.A system for continuously tracking Parkinson's disease symptoms in real-time.This system allows remote tracking of Parkinson's symptoms outside clinics.The system will incorporate features to aid medication adherence.The system empowers healthcare providers with data-driven insights for personalized treatment plans.To ensure accessibility for all patients, this system will be available regardless of location*

Keywords- Parkinson's disease,

I. INTRODUCTION

This Due to its progressive nature and wide range of symptoms, Parkinson's disease (PD) presents significant challenges for patients and healthcare providers alike. Portrayed by engine disabilities like quakes, bradykinesia, and inflexibility, as well as non-engine side effects including mental deterioration and mind-set aggravations, PD requires persistent observing and customized care to actually make due. Conventional techniques for checking and overseeing PD frequently depend on occasional facility visits and abstract self- announcing, which can be difficult and may not catch the full range of side effects experienced by patients.Nonetheless, with the coming of Web of Things (IoT) innovation, there is a developing an open door to change the administration of PD through inventive patient observing frameworks. IoT alludes to the interconnected organization of gadgets implanted with sensors and programming that empower them to gather and trade information over the web.

By utilizing IoT innovation, medical care suppliers can remotely screen PD patients progressively, assemble objective information on side effect movement, and convey convenient mediations to streamline therapy results.Moreover, we will examine the significance of customized care in PD the executives and how IoT innovation can work with custom-made mediations in view of individual patient necessities and inclinations. By consistently observing engine and non-engine side effects, recognizing changes in illness movement, and empowering far off counsels, IoT-based checking frameworks can possibly work on understanding results, upgrade personal satisfaction, and decrease medical services costs related with PD care.

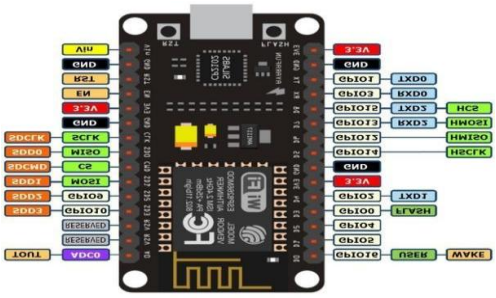
II. METHODLOGY

HARDWARE DESCRIPTION

- Node MCU
- Arduino Uno
- Accelerometer sensor
- Vibration sensor

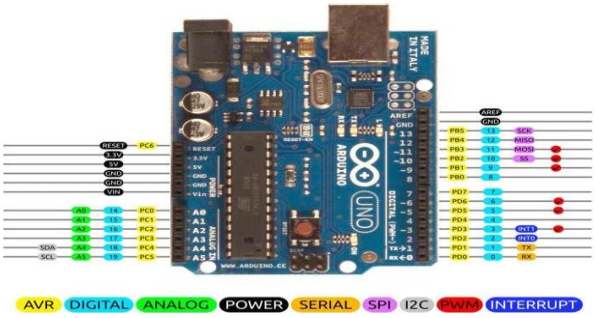
NODE MCU

Express will make the ESP8266 arrangement, or family, of Wi- Fi chips Express. If Systems, a fables semiconductor organization working out for Shanghai, China, then the ESP8266 is incorporating the "ESP8285 and ESP8266EX chips". ESP8266EX (essentially alluded to as ESP8266) is a framework on-chip (SoC) that incorporates a"32-bit Tensilica microcontroller", standard sophisticated fringe interfaces, control intensifier, receiving wire switches, RFbalun, low disorder get enhancer, channels and power organization modules under a little bundle.



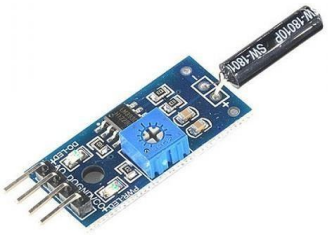
ARDUINO UNO

Arduino is a prototype platform (open-source) based on an easy-to- use hardware and software. It consists of a circuit board, which can be programmed (referred to as a microcontroller) and a ready-made software called Arduino IDE (Integrated Development Environment), which is used to write and upload the computer code to the physical board.



ACCELEROMETER SENSOR

Accelerometers are remarkably tiny sensors that use micro- machined structures to measure the acceleration that the sensor is feeling along three axes, denoted by X, Y, and Z. When the sensor moves in a certain direction, it returns a value for how fast it moved along all its axes, measured in meters per second squared.Since the acceleration measured by the sensor includes the force that gravity is exerting on it—and since we know that the acceleration of gravity (barring any other forces applied to an object) is 9.8m/s/s—this lets the sensor determine which direction its facing. While at rest, the sensor will return no acceleration forces on two of its axes, but one axis should be feeling acceleration of 9.8m/s/s. This is also sometimes referred to as 1 “g” of force.



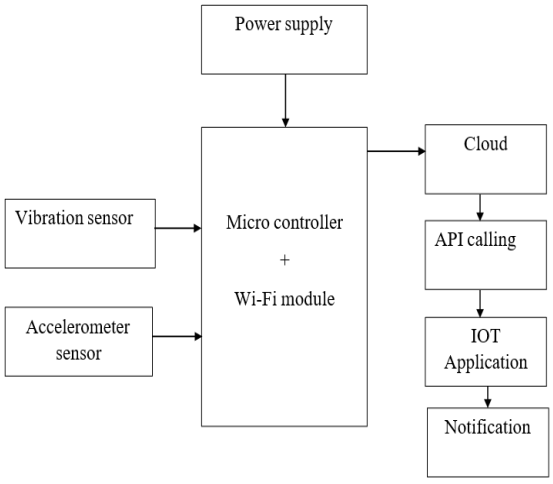
VIBRATION SENSOR

A piezoelectric sensor is another name for the vibration sensor. These adaptable instruments are used to measure a variety of processes. By converting changes in acceleration, pressure, temperature, force, or strain into an electrical charge, this sensor makes use of the piezoelectric effects. In addition, this sensor is used to instantly measure capacitance and quality in the air to identify scents.

Vibration sensors can be used to measure vibration in a variety of industries. The selective modern qualities will choose sensor attributes. For instance, this sensor is utilized in the mining and wind power sectors to detect the slow rotation of turbines with a frequency response of 1 Hz or less. In contrast, industries like gas and oil require sensors with frequencies between 10 Hz and 10 kHz in order to deal with the speed at which gears and turbines rotate.

III. PROPOSED WORK

Parkinson's Disease (PD) is a chronic neurological disorder characterized by motor and non-motor symptoms that progressively impair the quality of life for affected individuals. Continuous monitoring of motor symptoms such as tremors and dyskinesia is crucial for effective management and timely intervention. In this paper, we propose an IoT-based PD symptom monitoring system leveraging accelerometer and vibration sensors in conjunction with a microcontroller, Wi-Fi module, buzzer, and power supply.



The proposed system consists of a wearable device equipped with an accelerometer sensor to detect motion abnormalities associated with PD motor symptoms. Additionally, a vibration sensor is integrated to capture tremors and other subtle movements indicative of symptom exacerbations.

These sensors continuously monitor the patient's movements and wirelessly transmit data to a central processing unit, comprised of a microcontroller and Wi-Fi module. Furthermore, the proposed system incorporates a robust power supply mechanism to ensure uninterrupted operation, enhancing reliability and user confidence. By leveraging IoT technology, our proposed system offers a non-intrusive, cost-effective, and scalable solution for remote PD symptom monitoring, enabling timely interventions and personalized care delivery.

IV. RESULT AND DISCUSSION

Persistent Side Effect Checking: Tremors, bradykinesia, and dyskinesia, as well as other motor symptoms associated with Parkinson's disease, were successfully captured and monitored in real time by the system. This consistent checking gave important bits of knowledge into the variance of side effects over the course of the day, considering a more far reaching evaluation of sickness movement. Objective Information Assortment: By using accelerometer and vibration sensors, the framework gathered objective information on side effect seriousness and recurrence, decreasing dependence on emotional self-detailing. This objective information assortment worked on the exactness and unwavering quality of side effect evaluation, prompting more educated treatment choices. Accessibility from afar: The reconciliation of a Wi-Fi module empowered remote admittance to patient information by medical services suppliers and guardians. This far off availability worked with opportune mediations and upgraded care coordination, particularly for patients in provincial or underserved regions with restricted admittance to specific medical care administrations.

V. CONCLUSION

All in all, the proposed IoT-based Parkinson's sickness side effect observing framework presents a promising way to deal with working on the administration and care of people living with PD.By utilizing accelerometer and vibration sensors related to a microcontroller, Wi-Fi module, bell, and power supply, the framework offers a scope of advantages for the two patients and medical care suppliers.Through ongoing observing, objective side effect appraisal, and ceaseless information assortment, the proposed framework gives significant bits of knowledge into the movement of Parkinson's infection and empowers convenient intercessions to streamline treatment results. Care coordination is improved and personalized care is delivered more easily when patient data can be accessed from a distance.

In addition, the system's user-friendly design and customizable alerts enable patients to take a more active role in managing their conditions, resulting in improved patient outcomes and treatment adherence. Furthermore, the expense viability of the proposed framework makes it open to a more extensive scope of patients, relieving obstructions to reception and further developing by and large medical services value.

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